

Combined effects of deoxynivalenol and *Salmonella* Typhimurium on intestinal inflammation in the pig

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Deoxynivalenol (DON) is a trichothecene mycotoxin which frequently contaminates maize and small grain cereals in European countries with a temperate climate (Bottalico and Perrone, 2002). Pigs are considered particularly sensitive to the dietary intake of DON with as a major consequence substantial economic losses (Böhm, 1992). *Salmonella* Typhimurium is the predominant serovar isolated from pigs causing also economic losses and posing serious public health problems as pigs serve as a reservoir of infection for humans (Boyen et al., 2008).

The intestinal epithelial cells play an important role as a dynamic barrier, but also take part in the immune system by producing cytokines and chemokines crucial for recruitment and activation of several immune cells (Oswald, 2006). Ingestion of DON through contaminated feed may lead to high concentrations of the toxin in the intestine resulting in both barrier disruption and stimulation of the production of inflammatory cytokines by the intestinal cells (Prelusky et al., 1988; Maresca and Fantini, 2010).

A ligated intestinal loop model was used to evaluate whether the presence of relevant concentrations of DON could exacerbate the intestinal inflammation induced by *Salmonella* Typhimurium infection. In two 5-week-old piglets twelve loops were created in the ileum and 4 test conditions were randomly assigned: 1) negative control (Luria-broth, LB), 2) 1 µg/mL DON in LB, 3) 4 x 10⁸ cfu/mL of *Salmonella* Typhimurium, 4) 4 x 10⁸ cfu/mL of *Salmonella* Typhimurium in combination with 1 µg/mL DON. Six hours post administration, the pigs were euthanized and the loops were excised and processed for RNA isolation. To quantify the cytokines and chemokines of interest (IL-1β, IL-6, IL-8, IL-12, IL-18, TNFα, IFNγ and MCP-1) real-time quantitative PCR was utilized.

Results revealed that cotreatment with 1 µg/mL of DON potentiates the intestinal cytokine and chemokine response to *Salmonella* Typhimurium in ileal tissue by means of a higher mRNA expression of IL-1β, IL-12, IL-8, MCP-1, TNFα and IL-6, indicating an enhancement of the intestinal inflammation which could be harmful for both animal and human health.

References

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